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JUN 30 2006

Patent  
Avago Technologies Docket No.: 70980061-2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of: Kee Yean Ng

Group Art Unit: 2879

Application No.: 09/924,653

Examiner: Santiago, Mariceli

Filed: August 8, 2001

Docket No.: 70980061-2

For: LIGHT EMITTING DEVICES

Confirmation No. 5527

DECLARATION OF KEE YEAN NG UNDER 37 C.F.R. §1.131

Mail Stop Amendment  
Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

SMITH FROHWEIN TEMPEL  
GREENLEE BLAHA LLC  
CUSTOMER NO. 35856

Sir:

I, Kee Yean Ng, state the following:

1. I am the inventor of the subject matter disclosed, and claimed, in the above-referenced patent application.
2. The invention of the above-referenced patent application was conceived prior to April 4, 2001, as evidenced by the Agilent Technologies Invention Disclosure Form, assigned PDNO No. 70980061 (date redacted), a true and accurate copy of which is attached hereto as Exhibit A.
3. On August 9, 2000, patent application No. PI20003619 was filed in Malaysia, based on the subject matter disclosed on Agilent Technologies Invention Disclosure Form PDNO No. 70980061. The filing of Malaysian patent application No. PI20003619 constitutes a

**DECLARATION OF KEE YEAN NG UNDER 37 C.F.R. §1.131**

Application No. 09/924,653

Avago Technologies Docket No.: 70980061-2

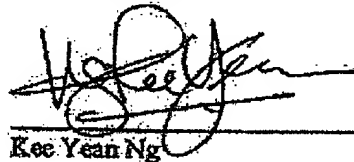
Page 2 of 3

constructive reduction to practice of the above-identified invention prior to April 4, 2001, which is the critical date of U.S. Patent No. 6,417,019 to Mueller *et al.* U.S. Patent No. 6,417,019 to Mueller *et al.* has been applied by the United States Patent and Trademark Office as a reference under 35 U.S.C. §103(a), in an Office Action dated April 6, 2006.

4. On August 8, 2001, the above-identified application was filed in the United States Patent and Trademark Office, claiming priority to Malaysian patent application No. PI20003619. A copy of the declaration for the above-identified application, which evidences the priority claim to Malaysian patent application No. PI20003619, is attached hereto as Exhibit B.
5. Based on the description of the light emitting device as detailed in the Agilent Technologies Invention Disclosure Form, assigned PDNO No. 70980061 and Malaysian patent application No. PI20003619, a person having ordinary skill in the art would be possessed of sufficient information to practice the invention at least as early as August 9, 2000, and would consider the invention to be constructively reduced to practice no later than August 9, 2000.

DECLARATION OF KEE YEAN NG UNDER 37 C.F.R. §1.131  
Application No. 09/924,653  
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I HEREBY DECLARE that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that any such willful false statements may jeopardize the validity of the above-referenced patent application, or any patent issued thereon.

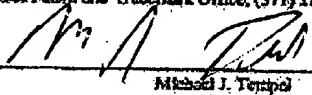


Kee Yeon Ng

30th June 2006  
Date

## CERTIFICATE OF FACSIMILE TRANSMISSION UNDER 37 C.F.R. §1.3

I hereby certify that this correspondence, including any items indicated as attached or included, is being transmitted via facsimile transmission to the United States Patent and Trademark Office, (371) 273-8300, on the date indicated below.

  
Mitchell J. Tenjopol

6/30/6  
Date

JUN 30 2006

EXHIBIT A

<b>INVENTION DISCLOSURE</b>		PAGE ONE OF <u>4</u>
PONO	70760061	DATE RCVD -
		ATTORNEY <u>EYU</u>

*Instructions: FILL IN ALL SECTIONS. The information contained in this document is COMPANY CONFIDENTIAL and may not be disclosed to others without prior authorization. Submit this disclosure to the HP Legal Department as soon as possible. No patent protection is possible until a patent application is authorized, prepared, and submitted to the Government.*

**Descriptive Title of Invention:**  
The design of a platform or step feature in a substrate, carrier or reflector cup for light emitting diode (LED) placement which will ensure a more uniform layer of luminescent material coating around the LED thus improving color uniformity in the radiation.

**Name of Project:**  
Malabar Project

**Product Name or Number:**  
3mm (T-3M) lamp

Was a description of the invention published, or are you planning to publish? If so, the date(s) and publication(s):  
No

Was a product including the invention announced, offered for sale, sold, or is such activity proposed? If so, the date(s) and location(s):  
No

Was the invention disclosed to anyone outside of HP, or will such disclosure occur? If so, the date(s) and name(s):  
No

*If any of the above situations will occur within 1 month, call your IP attorney or the Legal Department now at 530 5830 or 650 374 5830.*

Was the invention described in a lab book or other record? If so, please identify (lab book #, etc.):  
Yes, White lab book

Was the invention built or tested? If so, the date:  
Not yet

Was this invention made under a government contract? If so, the agency and contract number:  
No

**Description of Invention:** Please preserve all records of the invention and attach additional pages for the following. Each additional page should be signed and dated by the inventor(s) and witness(es).

- A. Prior solutions and their disadvantages (if available, attach copies of product literature, technical articles, patents, etc.).
- B. Problems solved by the invention.
- C. Advantages of the invention over what has been done before.
- D. Description of the construction and operation of the invention (include appropriate schematic, block, & timing diagrams; drawings; samples, graphs; flowcharts; computer listings; test results, etc.).

**Signature of Inventor(s):** Pursuant to my (our) employment agreement, I (we) submit this disclosure on this date: ( )

173560	Ho Kee Yoon	650 5607	R&D	NPM
Employee No.	Name	Telephone	Mailstop	Entry & Lab Name
	Signature			
Employee No.	Name	Telephone	Mailstop	Entry & Lab Name
	Signature			
Employee No.	Name	Telephone	Mailstop	Entry & Lab Name
	Signature			
Employee No.	Name	Telephone	Mailstop	Entry & Lab Name
	Signature			

*If more than four inventors, include additional information on another copy of this form and attach to this document.*

Form 3.1 IPAP - 7

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INVENTION DISCLOSURE		COMPANY CONFIDENTIAL		PAGE	OF
Signature of Witness(es): (Please try to obtain the signature of the person(s) to whom invention was first disclosed.)					
The invention was first explained to, and understood by, me (us) on this date:					
Full Name	Signature	Date of Signature			
NG KEE YEAN					
Full Name	Signature	Date of Signature			
Inventor & Home Address Information: (If more than four inventors, include additional information on a copy of this form & attach to this document)					
Inventor's Full Name					
NG KEE YEAN					
Street					
6, HALAMAN KIKK, TAMAN INDERAWASIH,					
City	State		Zip		
PRAI	PENANG		13600		
Do you have a Residential P.O. Address? P.O. BOX					
NO	City	State	Zip		
Created as (surname, middle name, etc.)					
KEE YEAN		Citizenship	MALAYSIAN		
Inventor's Full Name					
Street					
City	State		Zip		
Do you have a Residential P.O. Address? P.O. BOX					
City	State	Zip			
Created as (surname, middle name, etc.)					
Citizenship					
Inventor's Full Name					
Street					
City	State		Zip		
Do you have a Residential P.O. Address? P.O. BOX					
City	State	Zip			
Created as (surname, middle name, etc.)					
Citizenship					
Inventor's Full Name					
Street					
City	State		Zip		
Do you have a Residential P.O. Address? P.O. BOX					
City	State	Zip			
Created as (surname, middle name, etc.)					
Citizenship					

Form 3.1 IPAP -

## Title: Color Uniformity Improvement of Devices built with Light Emitting Diodes and Luminescent Materials

### Introduction

The use of luminescent materials, for example phosphor, in conjunction with light emitting diodes (LED) to produce a variety of color mixtures was demonstrated a couple of years ago. A typical device construction is shown in Figure 1. The assembly involves putting down a layer of luminescent material in the path of the light emitted by the LED. Typically, this layer is laid down such that it coats all around the die.

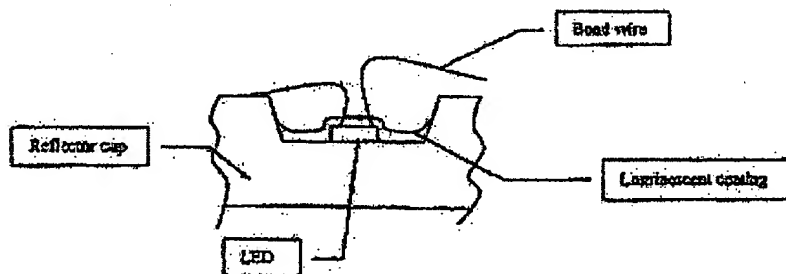


Figure 1 Construction of a LED/luminescent material assembly

This radiation pattern of such a construction suffers from color non-uniformity. The outer rim of the radiation pattern is not of the same color as the on-axis radiation. For example, in the construction of a semiconductor lamp consisting of a blue LED with YAG:Ce<sup>3+</sup> phosphor, a yellow ring is seen of the perimeter of the radiation pattern. Viewing the lamp on-axis and off-axis gives different colors. The reason for this defect is that the amount of luminescent material surrounding the LED is non-uniform, especially so at the sides which tends to have excessive material. This is an artifact of the device construction method.

### Improvement

The device construction can be improved by placing the LED at a different level from the phosphor. This can be achieved by:

1. Designing a platform or step in the substrate, carrier or reflector cup where the LED is placed. This platform is an inherent feature of the substrate, carrier or reflector cup.
2. Placing a secondary material into the substrate, carrier or reflector cup such that it forms a platform for the LED to sit.

This is shown in Figure 2 below.

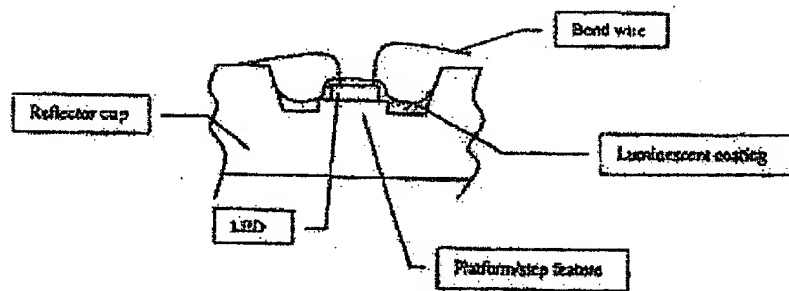


Figure 2 Incorporation of a platform feature

#### Advantage

With the addition of a platform, the layer of luminescent material surrounding the LED becomes more uniform since the excess material falls to the bottom below the LED. The platform can be of any shape. The best shape is that which give a uniform layer of luminescent material all around the LED. The height of the platform can be varied depending of the thickness of the luminescent material needed. The top dimension of the platform is such that it allows only the necessary amount of luminescent material to stay around the die.

#### What is claimed are:

1. The design feature of a raised platform for LED placement such that upon the deposition or coating of a luminescent material, will ensure a consistent thickness of the material around the LED. The excess material is allowed to drop to the bottom.
2. The raised feature can be an inherent part of the substrate, carrier or reflector cup or it can be an additional part which is attached into the substrate, carrier or reflector cup.
3. The platform can be shaped to match the shape of the LED.

-end-

JUN 30 2006

## PATENT APPLICATION

DECLARATION AND POWER OF ATTORNEY  
FOR PATENT APPLICATION

ATTORNEY CHECK NO. 70980081-2

As a below named inventor, I hereby declare that:

My residence/post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Light Emitting Devices

The specification of which is attached hereto unless the following box is checked:

( ) was filed on \_\_\_\_\_ as US Application Serial No. or PCT International Application Number \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understood the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose all information which is material to patentability as defined in 37 CFR 1.56.

Foreign Application(s) and/or Claims of Foreign Priority

I hereby claim foreign priority benefits under Title 35, United States Code Section 119 of any foreign application(s) for patent or inventor(s) certificate listed below and have also identified below any foreign application for patent or inventor(s) certificate having a filing date before that of the application on which priority is claimed:

COUNTRY	APPLICATION NUMBER	DATE FILED	PRIORITY CLAIMED UNDER 35 U.S.C. 119
Malaysia	PI20003819	9 August 2000	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
			YES <input type="checkbox"/> NO <input type="checkbox"/>

Provisional Application

I hereby claim the benefit under Title 35, United States Code Section 116(a) of any United States provisional application(s) listed below:

APPLICATION SERIAL NUMBER	FILING DATE

U. S. Priority Claim

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION SERIAL NUMBER	FILING DATE	STATUS (Not entered/pending/abandoned)

## POWER OF ATTORNEY:

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

Customer Number 022878

Place Customer  
Number Bar Code  
Label Here

Send Correspondence to:  
AGILENT TECHNOLOGIES  
Legal Department, 510-PO  
Intellectual Property Administration  
P.O. Box 38043  
Santa Clara, California 95052-8043

Direct Telephone Calls To:

Herbert R. Schulze  
(850) 485-4377

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Inventor: Kee Yean NgCitizenship: MalaysiaResidence: 8, Halaman KKK, Taman Inderawasih, Prati 13600 Penang, MYPost Office Address: Same as residence

Inventor's Signature

Date 5 JAN 2001

See 1802 (Doc-P)

(Use Page Two For Additional Inventor(s) Signatures)

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